

# Urinary Problems

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Disorders of the urinary tract are ubiquitous in primary care practice. Appropriate detection, diagnosis, and treatment of these common conditions will minimize morbidity and prevent the development of complications.

## ACUTE CYSTITIS

### Symptoms

- Dysuria ++++
- Frequency ++++ (dysuria and frequency without vaginal discharge or vaginal irritation increases probability of UTI to >90%)
- Urgency +++
- Suprapubic pain ++
- Hematuria ++
- Urethritis +
- Vaginitis +
- Nausea, vomiting + (suggests upper UTI)

### Signs

- Fever +
- Suprapubic pain ++
- Costovertebral angle tenderness +
- Pelvic examination if urethritis or vaginitis +

### Workup

- Urinalysis—Instruct on proper urine collection technique to avoid vaginal contamination.  $10^5+$  WBCs/mL in a urinalysis is both sensitive (95%) and specific (71%) for UTI. Bacteria seen on microscopy is 50% sensitive and 90% specific. WBC casts indicate an upper UTI. Hematuria is associated with UTIs, kidney stones, and menstrual bleeding, but is not generally associated with vaginitis or urethritis.
- Urine cultures—Not routinely necessary with uncomplicated UTIs because infectious organisms are well known and symptoms are likely to resolve or worsen prior to result availability. Cultures are indicated if a complicated UTI is suspected, or if symptoms persist or recur less than 1 month after previous antimicrobial therapy for a UTI.

- Urine dipstick—Leukocyte esterase (sensitivity 75% to 96%, specificity 94% to 98%); nitrite is specific for enterobacteriaceae. However, it does not detect low-count UTIs, or other species, and can be falsely positive if using OTC phenazopyridine, or if eating beets.

### Comments and Treatment Considerations

- Postcoital voiding—Flush urethra regularly with adequate hydration to increase voiding frequency. Consider postcoital vitamin C or cranberry juice to acidify the urine and to hydrate the patient sufficiently to result in nocturia, to prevent prolonged duration between voiding. Avoid spermicide use. Consider intravaginal estrogen if postmenopausal.
- Antibiotics—If local *Escherichia coli* resistance to TMP-SMX is less than 20% and the patient has no sulfa allergy, then TMP-SMX 160/800 mg orally twice a day for 3 days. If local *E. coli* resistance rates are greater than 20% or the patient has a sulfa allergy, then nitrofurantoin 50 to 100 mg PO every 6 hours for 7 days or fosfomycin 3 g single dose. Alternative is ciprofloxacin 250 mg orally twice a day for 3 days, extended release ciprofloxacin 500 mg orally daily for 3 days; levofloxacin 250 mg orally daily for 3 days. Do not use moxifloxacin or gemifloxacin.

Add phenazopyridine if the patient has dysuria: 100 to 200 mg PO three times a day for 2 days.

## BENIGN PROSTATIC HYPERPLASIA

Benign prostatic hyperplasia (BPH) is a disorder affecting males that increases in frequency with age. It affects roughly 25% of men ages 41 to 50, 40% to 50% of men ages 51 to 60, 70% of men ages 61 to 70, and more than 80% in men older than age 80. Untreated BPH can cause acute urinary retention, recurrent urinary tract infections, hydronephrosis and rarely, renal failure. BPH develops in the periurethral transitional zone of the prostate. No causal relationship between BPH and prostate cancer has been established.

### Symptoms

Measure symptoms with the American Urologic Association symptom score. Scores range from 0 (never present) to 5 (almost always present). Total the symptom scores: mild BPH, 0-7; moderate, 8-19; severe, 20+.

- Frequency (0-5)
- Nocturia (0-5)
- Hesitancy (0-5)
- Urgency (0-5)
- Weak urinary stream (0-5)
- Intermittence (0-5)
- Incomplete emptying (0-5)

### Signs

- Digital rectal examination: assess prostate size, consistency, nodularity, firmness, and/or asymmetry, which suggests prostate cancer. The transitional zone of the prostate, which surrounds the urethra, cannot be felt on digital rectal examination.

### Workup

- Urinalysis—Urinary tract infections can cause similar symptoms
- Serum creatinine—Renal etiologies, but also bladder outlet obstruction
- Serum PSA
  - If the patient has obstructive symptoms, the specificity of PSA is lower than in asymptomatic men.
  - Consider that PSA levels may be affected by digital rectal examination or ejaculation prior to testing.
  - Results should be interpreted with age, race, and perhaps weight-based norms.
- Maximal urinary flow rate
- Postvoid residual volume can be determined by a postvoid in-out catheter.
- Rule out:
  - Neurogenic bladder
  - Prostatitis
  - Urethral stricture (any history of urethral instrumentation)
  - Bladder neck contracture
  - Prostate cancer
  - Bladder cancer
- Anticholinergic drugs impairing bladder function
- Sympathomimetic drugs that increase outflow resistance

### Comments and Treatment Considerations

Treatment is generally indicated when the symptoms of BPH begin to interfere with the patient's quality of life, or if he develops upper or lower urinary tract complications. Medical treatment is usually based on symptom progression as measured by the American Urologic Association symptom score and, when indicated, urine flow rate studies.

The  $\alpha$ -adrenergic antagonists (terazosin, doxazosin, tamsulosin, and alfuzosin) act on the physiologic and reversible component of the obstructive symptoms. They are effective in the short term. The 5- $\alpha$ -reductase inhibitors (finasteride, dutasteride) act on the fixed obstructive component by reducing the size of the prostate gland.

## PYELONEPHRITIS

Uncomplicated pyelonephritis is a kidney infection in a healthy person who does not have comorbid conditions that could complicate treatment.

Complicated pyelonephritis includes patients with renal calculi, diabetes mellitus, pregnancy, a neurogenic bladder, obstruction, urinary tract diverticula, fistula, urinary diversions, vesicoureteral reflux, an indwelling catheter, a ureteral stent, a nephrostomy tube, renal failure, renal transplant, immunosuppression, and multidrug-resistant organisms.

## Symptoms

The first two are more frequent in pyelonephritis than a UTI; the remainder may be found in both.

- Flank pain +++
- Nausea/vomiting ++
- Dysuria ++++
- Urgency, frequency ++++
- Suprapubic pain ++
- Hematuria ++

## Signs

- Fever ( $>37.8^{\circ}\text{C}$ )
- Costovertebral angle tenderness ++

## Workup

- Pyuria is present in a large percentage of women with pyelonephritis. WBC casts indicate the infection is from an upper urinary tract source. Most have elevated WBC count and usually elevated ESR and CRP.
- Consider pelvic examination because pelvic inflammatory disease is commonly mistaken for pyelonephritis. Look for evidence of vaginitis, urethral discharge, herpetic lesions, cervical motion tenderness, and ectopic mass, and strongly consider cervical cultures and pregnancy testing.
- Bacteremia (blood cultures are positive in 10% to 20% of women with acute uncomplicated pyelonephritis); blood cultures may be limited to patients who need hospitalization. Nitrite should not solely be relied on because it does not detect non-nitrate-reducing organisms such as *Staphylococcus*.

## Comments and Treatment Considerations

- Indications for hospitalization: nausea and vomiting to an extent that preclude oral hydration and oral medications; concerns about patient compliance, unclear diagnosis, or marked illness with high fevers, pain, or debilitation; also if there is any concern for complicated pyelonephritis
- The advent of the fluoroquinolones, which have the similar bioavailability IV or orally, has increased the number of patients who can be managed as outpatients. If outpatient management is attempted the patients should be called or seen after 2 to 3 days of therapy to ensure improvement and defervescence. Also this is usually the point when urine or blood cultures with sensitivities become available and may change treatment.
- In complicated pyelonephritis a repeat urine culture should be obtained 1 to 2 weeks after completed antibiotic therapy. In uncomplicated pyelonephritis it is not generally necessary to repeat urine culture.
- Imaging: routine imaging is not indicated unless the patient has a second episode of pyelonephritis, or symptoms persist more than 48-72 hours. At that time CT or US may be used to look for renal calculi, perinephric abscess, or anatomic abnormality.

## URETERAL CALCULUS

An estimated 12% of men and 8% of women will develop kidney stones by age 70. There is a 15% chance of recurrence within 1 year, 35% to 40% chance by 5 years, and 80% chance by 10 years. Approximately 80% of stones are calcium oxalate or calcium phosphate; the remainder are uric acid, struvite (magnesium ammonium phosphate), and cystine. Risk factors include a history of stones, hypercalciuria, hyperuricosuria, hypocitraturia, low dietary calcium intake, low fluid intake, family history of kidney stones, short bowel syndrome, diarrhea, obesity, dehydration, and frequent UTIs.

### Symptoms

- Renal colic (usually lasts 20 to 60 minutes) ++++
- Atraumatic, unilateral flank pain ++++
- Passage of "gravel" or small stones in urine ++++
- Hematuria ++++
- Difficulty urinating +++
- Groin pain +++
- Urgency (typically occurs when the stone has entered the bladder) +++
- Dysuria (typically occurs when the stone has entered the bladder) +++
- Vague abdominal pain ++
- Acute abdominal pain ++
- Nausea ++

### Workup

- Urinalysis (looking for hematuria and evidence of urinary tract infection)
- hCG to rule out ectopic and/or minimize fetal radiation exposure
- Noncontrast helical CT (sensitivity 95%, specificity 98%)
- Use US in patients who should avoid radiation (i.e., pregnant patients).
- Strain for stones to determine stone composition, which may suggest means to prevent recurrence, or need for further workup.

### Comments and Treatment Considerations

Uric acid stones are radiolucent. Stones may be missed that are smaller than the width of the CT scan slices (standard cuts are generally 8mm). A dilated ureter may represent a recently passed stone. Approximately 95% of stones less than 2 mm are passed on their own in an average of 8.2 days, with 95% passed within 31 days; 83% of stones 2 to 4 mm are passed on their own in an average of 12.2 days, with 95% of stones passed in 40 days; and 50% of stones 4 to 6 mm are passed on their own in an average of 22 days, with 95% passed in 39 days.

Urology should be consulted if there is evidence of UTI, acute renal failure, anuria, or intolerable or protracted pain.

Pain medications should include NSAIDs and opioids. NSAIDs decrease ureteral smooth muscle tone, but exercise caution in patients with renal disease. Indomethacin and ketorolac have been studied in renal colic and are effective.

Increase water intake to 2L/day.

## URETHRITIS

Urethral inflammation generally has three possible causes: a sexually transmitted infection—specifically *Neisseria gonorrhoeae* and *Chlamydia trachomatis*—a urinary tract infection, or a vaginal infection.

### Symptoms

- Urethral discharge ++++
- Dysuria ++++
- Urgency +++
- Frequency ++
- Vaginal discharge ++
- Genital ulcers ++

### Signs

- Urethral discharge ++++
- Genital lesions +++
- Cervical motion tenderness +++
- Epididymitis ++

### Workup

- Urinalysis
- Pelvic examination, to include vaginal sample with wet mount and KOH to assess for bacterial vaginosis, trichomonas, or yeast infections
- Consider STD screening—Include gonorrhea/chlamydia

### Comments and Treatment Considerations

UTIs can cause urethral irritation and dysuria, but they do not commonly cause urethral discharge. Vaginal inflammation from a yeast infection, bacterial vaginosis, trichomonas, or other causes could masquerade as dysuria when the voiding of urine contacts vulvar tissue.

Most gonorrheal infections in men produce a thin to thick mucoid urethral discharge that prompts evaluation. Urethritis that is not caused by *N. gonorrhoeae* is called nongonococcal urethritis (NGU), and is caused primarily by *C. trachomatis* and *Ureaplasma urealyticum*. It is not possible to differentiate among these infections based solely on urethral discharge, and they may be concurrent.

Treatment should be directed toward the organism. Please see the section on urinary tract infections for recommendations for that disorder. For gonorrhea, a one-time dose of ceftriaxone is effective. For chlamydia a 7-day course of doxycycline or a one-time dose of azithromycin are recommended. For vaginal infections see the respective sections for treatment guidelines.

## URINARY TRACT INFECTION (UTI)

A woman's lifetime risk for having a UTI is approximately 50% to 60%. A young woman's risk is approximately 0.5 episode per person year; 25% of women get recurrent episodes, with an average of 2.6 episodes per year. Causative organisms include *E. coli* (80% to 85%) and *Staphylococcus saprophyticus* (5% to 15%); the remainder are enterococci and other uropathogens.

A complicated UTI includes:

- Pregnancy
- Upper UTI
- Antibiotic-resistant organisms
- Male gender
- Older adult
- Hospital acquired
- Indwelling urinary catheter
- Anatomic abnormalities
- More than 7 days of symptoms at time of presentation
- DM
- Recurrent infections
- Immunosuppression

If a UTI is complicated this may change the type and duration of antibiotics used.



### RISK FACTORS

- Sexual intercourse
- Spermicide containing contraceptives (presumably by killing normal vaginal flora)
- A history of greater than six UTIs
- Insulin-dependent DM

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